PREFACE

In the domain of agricultural science, the plant is the central figure which concerns primarily and around which revolve the activities of all agricultural scientists. The cultivation of food crops is an ancient art, but with the growth of population and the eventual pressure on land the importance of growing more crops, to keep the ever increasing population fed, was brought to the forefront in the programme of world economy. Growing crops continuously on a soil, which is the principal source of plant food, tends gradually to impoverish the soil after a certain time. This tendency coupled with the difficulty in making the plant foods easily available to the crops presented problems which required the attention of scientists. This is how science was brought to bear upon the problems of agriculture in the beginning of the 19th century. To the mineral theory of plant nutrition propounded by Leibig and the advent of Lawes and Gilbert in the field of scientific agriculture together with other pioneers on the Continent, may be traced the birth of modern agricultural science in relation to crops and soils.

India, however, followed suit about half-a-century later. The Geological Survey of India which was founded in the year 1846 was perhaps the pioneer in India in the study of her soils from the geological and mineralogical points of view. The first paper on the subject was published by the Survey in 1860 although actually Buchanan-Hamilton, a traveller, published in 1807 a book dealing with the geology of the South Indian soils. The work continued until 1895 when the geological study began to be supplemented by the examination of soils and crops in their mutual relationship. This was actually the beginning of the scientific study of soils and crops in India. Since then advances in this direction have been made with a strident pace, and the agricultural scientists scattered over this vast sub-continent have been making contributions adding newer knowledge to the subject. The subject has become so vast in scope and complex in variety that for any investigator to keep pace with the rapid march of knowledge, incorporated in a variety of periodical literature published in or outside India, is a matter of extreme difficulty unless the information has been fully and minutely indexed in a library and issued for general circulation. In this regard the Imperial Bureau of Soil Science has been rendering a signal service. But as they started with the year 1931 leaving out the references previous to that date and as much information contained in the annual reports issued by the various departments of agriculture

which are regarded as very valuable is not included in their purview, the scientists especially those in India where good libraries are more an exception than a rule are placed at a disadvantage which cannot be easily obviated.

The only solution of this problem appeared to be to compile a consolidated bibliography of all literature pertaining to India on soils and fertilizers so that the Indian research workers in this field might be aware of what has been achieved and what remains to be achieved. With this end in view the compilation of this bibliography was undertaken about four years ago, and has now been brought up to the end of 1942. Every endeavour was made to make the bibliography complete, and with the exception of certain unimportant references it is believed that the bibliography will have achieved its object. If certain important references have escaped the notice of the compiler, it is not due to his lack of earnestness but may be a matter of unintentional omission which can be made good by the consultants themselves. It is hoped that this bibliography will serve them well.

K. K. GUHA ROY

New Delhi

1 January, 1944

CHRONOLOGICALLY ARRANGED UNDER EACH SUB-HEADING

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Soil temperature

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[*See also entries* 410, 412, 416, 1051, 1175, 1428, 1467]

Electro-chemical properties of the soil
(General, Buffering, Fixation, Base exchange, Colloidal properties)

(*a*) General

994. **Mukherjee, J. N.** (1931). On the nature of the reactions responsible for soil acidity. I. *Indian J. agric. Sci.* **1** : 189-203

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1004. **Mitra, R. P.** (1940). On the nature of the reactions responsible for soil acidity. VII. The electro-chemical properties of colloidal solutions of hydrogen clays. *Indian J. agric. Sci.* **10** : 317-43

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1009. **Chatterjee, B. & Sen, A.** (1942). Variations in the electro-chemical properties of hydrogen clay sols with temperature. *J. Indian chem. Soc.* **19** : 189

1010. **Mitra, R. P.** (1942). Electro-chemical aspects of ion exchange in clays, bentonites and clay minerals. *Indian Soc. Soil Sci. Bull.* No. 4 : 41-147

1011. **Mitra, R. P. & Das, S. R.** (1942). Free and titratable acids per particle of subfractions of hydrogen clay. *J. Indian Chem. Soc.* **19** : 401-02

1012. **Mitra, R. P. & Ghosh, K. C.** (1942). Effect of non-electrolytes on the pH and specific conductivity of hydrogen clays sols. *J. Indian chem. Soc.* **19** : 399-400

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[*See also entries* 546, 547, 548, 689, 1048, 1260]

(*b*) BUFFERING

1016. **Charlton, J.** (1924). The buffer action of some Burma soils. *Mem. Dep. Agric. India, Chem. Ser.* **7** : 101-21

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1023. **Raychaudhuri, S. P.** *et al.* (1941). Studies on the chemical constituents of Indian lateritic and red soils. II. Influences of free sesquioxides and free silica components of Indian red soils on the buffer curves of the soils. *Indian J. agric. Sci.* **11** : 603-13

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(*c*) Fixation

1026. **Norris, R. V.** (1924). Ammonia fixation in soils. *Madras agric. Chem. Dep. Rep.* 1923-24 : 115

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1029. **Viswanath, B.** (1933). The case for the electro-chemical fixation of atmosphere nitrogen in India. *Madras agric. J.* **21** : 291-99

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[*See also entries* 410, 416, 626, 684, 685, 1035, 1039]

(*d*) Base exchange

1031. **Burma Department of Agriculture** (1928). Base exchange phenomenon in Burma soils. *Burma Dep. Agric., Rep. agric. Chem.* 1928 : 4

1032. **Burma Department of Agriculture** (1929). Base exchange phenomenon in Burma soils. *Burma Dep. Agric., Rep. agric. Chem.* 1929 : 2

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1052. **Puri, A. N.** (1939). Colloidal properties of soils. Part IV. Base exchange. *Punjab Engng.* **1** (12)

1053. **Puri, A. N. and Uppal, H. L.** (1939). Base exchange in soils. I. A critical examination of the methods of finding base-exchange capacity of soils. *Soil Sci.* **47** : 245-53

1054. **Mitra, R. P. and Mitra, A. K.** (1940). The base binding capacities of hydrogen clays as determined by different methods. I. *Indian J. agric. Sci.* **10** : 344-51

1055. **Raychaudhuri, S. P. and Nandy Mazumdar, A. B.** (1940). Studies in Indian red soils. I. Buffer curves and base-exchange reactions. *Indian J. agric. Sci.* **10** : 62-81

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1058. **Mukherjee, J. N.** (1942). Base exchange in soils and clays. *Indian Soc. Soil Sci. Bull.* No. **4** : 7-24

1059. **Mukherjee, J. N. and Chatterjee, B.** (1942). Interaction between hydrogen clays and neutral salts. I. The nature of the interaction responsible for the liberation of aluminium. *Indian J. agric. Sci.* **12** : 105-12

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1069. **Sen, A. T. and Bose, S. K.** (1942). Studies on laterite and red soils of India : the effect of manures on the exchangeable bases in three years continuously fertilised plots in the Dacca red soils. *Indian Soc. Soil Sci. Bull.* No. 4 : 34-40

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[*See also entries* 1021, 1022, 1024, 1177, 1258, 1261, 1304]

(*e*) Colloidal properties

1071. **Puri, A. N.** (1930). Studies in soil colloids. II. Factors influencing the dispersion of soil colloids in water. *Mem. Dep. Agric. India, Chem. Ser.* **11** (2)

1072. **Puri, A. N.** (1930). Studies in soil colloids. III. Flocculation of soil colloids. *Mem. Dep. Agric. India, Chem. Ser.* **11** (6)

1073. **Narasimhiah, A. N.** (1936). On the scheme of study of the colloids in tropical soil. *Proc. Adv. Bd. Imp. Coun. agric. Res.* 1936 : 301-03

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1075. **Puri, A. N.** (1939). Colloidal properties of soils. *Punjab Engng.* **1** (7)

1076. **Puri, A. N.** (1930). Colloidal properties of soils. Part III. The clay complex. *Punjab Engng.* **1** (9)

1077. **Puri, A. N. and Lal, M.** (1939). Dispersion and stability of soil colloids in water. I. Autodisintegration. *Punjab Irrig. Res. Inst. Res. Publ.* **4** (10)

1078. **Rao, A. S.** *et al.* (1939). Colloid content and the hygroscopic power of soils. *Indian J. agric. Sci.* **9** : 503-10

1079. **Mukherjee, J. N. and Sen-Gupta, N. C.** (1940). Formation of aggregates and structures in dilute solutions of hydrogen bentonites. *Nature* **145** : 971-72

[*See also entries* 235, 622, 744, 745]

Soil reaction, *p*H

(General, Acid soils, Alkaline soils & Saline soils)

(*a*) General

1080. **Bengal Department of Agriculture** (1925). Soil survey : liming of red soils and acidity studies. *Bengal Dep. Agric. Ann. Rep.* 1924-25 : 17

1081. **Harler, C. R.** (1927). The effect of phosphatic manure on soil acidity. *Quart. J. Indian Tea Ass. Pt.* **4** : 199-203

1082. **Harrison, W. H. and Vridhachalam, P. N.** (1929). The application of the antimony electrode to the determination of the pH value and the lime requirement of soils. *Mem. Dep. Agric. India, Chem. Ser.* **10** (4)

1083. **Bengal Department of Agriculture** (1930). Soil reaction studies. *Bengal Dep. Agric. Ann. Rep.* 1929-30 : 60

1084. **Hoon, R. C. and Taylor, E. M.** (1931). An examination of some of the factors determining the hydrogen-ion-concentration of suspensions of Punjab soils. Part I. The effect of concentration of the soil water suspension. Pt. II. The variation of the hydrogen-ion-concentration of the soil suspensions with time. *Mem. Punjab Irrig. Res. Inst.* **4** (1) and (2).

1085. **Viswanathan, K. S.** (1931). H-ion concentration of South Indian soils and the methods of estimating the same. *Madras agric. Chem. Dep. Rep.* 1930-31 : 12-15

1086. **Lakshmanrow, T.** (1932). The antimony electrode in soil work. *Curr. Sci.* **1** : 34

1087. **Puri, A. N.** (1932). The use of antimony electrode for determining soil reaction. *Mem. Punjab Irrig. Res. Inst.* **4** (4)

1088. **Viswanath, B.** (1932). Determination of pH of soils. *Madras agric. Chem. Dep. Rep.* 1932-32 : 17-18

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1090. **Viswanath, B.** (1933). Soil reaction and buffer values of aqueous soil extracts. *Madras agric. Chem. Dep. Rep.* 1932-33 : 99-100

1091. **Viswanath, B.** (1933). Use of collodion sacks for pH estimates. *Madras agric. Chem. Dep. Rep.* 1932-33 : 11

1092. **Puri, A. N. and Asghar, A. G.** (1938). Influence of salts and soil-water ratio on pH value of soils. *Soil Sci.* **46** : 249-57

1093. **Puri, A. N. and Dua, A. N.** (1938). Hydrogen-ion activity of colloidal acids in soils. *Soil Sci.* **46** : 113-28

1094. **Puri, A. N. and Sarup, A.** (1938). Isohydric pH value of soils and its determination. *Soil Sci.* **46** : 49-56

1095. **Puri, A. N. and Sarup, A.** (1938). Oxidation-reduction potentials in soils. *Soil Sci.* **46** : 323-29

1096. **Mukherjee, J. N. and Chatterjee, B.** (1942). Interaction between hydrogen clays and natural salts. I. The nature of the interaction responsible for the liberation of aluminium. *Indian J. agric. Sci.* **12** : 105-12

1097. **Chatterjee, B. and Paul, M.** (1942). Interaction between hydrogen clays and neutral salts. II. The role of aluminium ions in relation to the free and total acids of hydrogen clays. *Indian J. agric. Sci.* **12** : 113-20

1098. **Mukherjee, J. N.** *et al.* (1942). On the nature of reactions responsible for soil acidity. VIII. The acid character of hydrogen clay in relation to some problem of soil science. *Indian J. agric. Sci.* **12**: 86-104

1099. **Mukherjee, J. N. and Mitra, R. P.** (1942). On the nature of reactions responsible for soil acidity. IX. The acid character of hydrogen clays. *Indian J. agric. Sci.* **12**: 433-73

[*See also entries* 593,1033,1051,1063,1070]

(*b*) ACID SOILS

1100. **Meggitt, A. A. and Birt, A. G.** (1913). Preliminary note on the occurrence of acidity in highland soils. *Agric. J. India* **8**: 69-73

1101. **Meggitt, A. A.** (1914). Studies of an acid soil in Assam. *Mem. Dep. Agric. India, Chem. Ser.* **3**: 235-69

1102. **Warth, F. J. and Saw, M. P.** (1919). Absorption of lime by soils. *Mem. Dep. Agric. India, Chem. Ser.* **5** (6)

1103. **Carpenter, P. H. and Harler, C. R.** (1921). The nature of soil acidity in North-East India. *Quart. J. Indian Tea Ass. Pt.* **3**: 121-44

1104. **Atkins, W. R. G.** (1922). Hydrogen-ion concentration of some Indian soils and plant juices. *Agric. Res. Inst. Pusa Bull.* No. 136

1105. **Anonymous** (1923). Liming of Assam soils. *Assam Dep. Agric. Bull.* No. 2

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1107. **Carpenter, P. H.** *et al.* (1925). Soil acidity and the use of lime on tea soils. *Quart. J. Indian Tea Ass. Pt.* **1**: 1-11

1108. **Mitra, S. K. and Phukan, L. N.** (1926). Wood ashes as an ameliorant of soil acidity. *Agric. J. India* **21**: 357-65

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1110. **Imperial Institute of Agricultural Research, Pusa** (1927). Lime requirement studies of acid soil. *Imp. Inst. Agric. Res. Pusa, Sci. Rep.* 1926-27 : 31

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1113. **Harrison, W. H. and Vridhachalam, P. N.** (1929). The application of the antimony electrode to the determination of the pH value and the lime requirement of soils. *Mem. Dep. Agric. India, Chem. Ser.* **10** : 157-68

1114. **Imperial Institute of Agricultural Research, Pusa** (1929). Lime requirement studies of acid soil. *Imp. Inst. agric. Res. Pusa, Sci. Rep.* 1928-29 : 32

1115. **Bihar and Orissa Department of Agriculture** (1930). Soil acidity studies in relation to plant growth. *Bihar and Orissa Dep. Agric. Ann. Rep.* 1929-30 : 30

1116. **Harrison, C. J.** (1930). The acidity of tea soils in North-East India. *Quart. J. Indian Tea Ass. Pt.* **4** : 170-89

1117. **Bengal Department of Agriculture** (1931). Paddy soil acidity studies. *Bengal Dep. Agric. Ann. Rep.* 1930-31 : 6

1118. **Imperial Institute of Agricultural Research, Pusa** (1931). Lime requirement studies of acid soil. *Imp. Inst. agric. Res. Pusa, Sci. Rep.* 1930-31 : 57

1119. **Harrison, C. J.** (1932). The acidity of tea soils of North-East India. Part II. The treatment of soils of low acidity. *Quart. J. Indian Tea Ass. Pt.* **2** : 70-77

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[*See also entries* 208, 471, 472, 476, 483, 497, 501, 502, 505, 514, 519, 525, 528, 529, 531, 534, 544, 549, 562, 969, 970, 976, 1443]

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FERTILIZERS AND MANURES

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[*See also entries* 177, 179, 180, 181, 479, 584, 847, 1069, 1446]

Fertilizers and manures in relation to crops

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PLANT AND SOIL NUTRITION

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[*See also entries* 1775, 1926]

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FERTILIZERS AND MANURES : COMPOSITION, PREPARATION, PRODUCTION AND USE

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[*See also entries* 1809, 1821, 1838, 1869, 1881]

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[*See also entry* 1927]

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